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(54) **A COOLING DEVICE COMPRISING AN EVAPORATION TRAY**

EINE VERDUNSTUNGSSCHALE UMFASSENDE KÜHLVORRICHTUNG

DISPOSITIF DE REFROIDISSEMENT COMPRENANT UN PLATEAU D ÉVAPORATION

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Description

[0001] The present invention relates to a cooling device comprising an evaporation tray which enables evaporation of the defrost water.

[0002] In cooling devices, for example refrigerators or freezers, the defrost process is performed in order to deice the frost formed on the refrigeration system. In the defrost process, a container named as the evaporation tray is used wherein the water is collected and evaporated. In the known embodiments, the evaporation tray is placed on the compressor and the heat received from the compressor evaporates the water therein. The evaporation tray is produced such that it will be properly seated on the upper side of the compressor and to take the shape of the compressor body so that noise is not generated due to vibrations of the compressor; and when the compressor type is changed, the evaporation tray has to be changed also. Designing the evaporation tray separately for different types of compressors causes an increase in the costs.

[0003] In the Korean patent document no KR19990012724, in a refrigerator a water collection tray is explained that stores the defrost water and which is integrated to the stand in order to utilize the inner volume more.

[0004] In the United States of America patent application no US2007051122, a housing is provided on the compressor of a refrigeration device and the evaporation tray is mounted on this housing. Document JP11083285 discloses an evaporator tray according to the preamble of claim 1.

[0005] The aim of the present invention is the realization of a cooling device that comprises a single type of evaporation tray suitable to be utilized with different types of compressors.

[0006] The cooling device realized in order to attain the aim of the present invention is explained in the claims.

[0007] The cooling device comprises a compressor that maintains a refrigeration cycle, a casing situated preferably at a rear and bottom side of a body wherein the compressor is placed together with components such as condenser and fan, a cover that covers the casing and prevents access to the components therein, and an evaporation tray, disposed inside the casing for collecting and evaporating water from the defrost process. The evaporation tray is integrated on the surface of the cover facing towards the inside of the casing such that it is just behind the compressor when the cover is closed.

[0008] The evaporation tray integrated to the cover, is configured as a flat box that protrudes from the cover toward the compressor and has a maximum depth as much as the distance between the cover and the compressor.

[0009] The evaporation tray comprises a wide heat transfer surface that faces the compressor body and is parallel to the plane of the cover.

[0010] The evaporation tray furthermore comprises a water inlet orifice arranged on its upper surface whereto a defrost water discharge hose is connected and an opening for the exit of the evaporated water.

[0011] In an embodiment of the present invention, the evaporation tray is produced as a piece separate from the cover and is mounted on the cover thereafter.

[0012] In another embodiment of the present invention, the evaporation tray is produced as a single piece together with the cover.

[0013] The evaporation tray is provided in a flow path of the air aspirated into the casing by the fan from holes on the cover and discharged out after passing over the condenser and the compressor, the heat of the condenser and the compressor carried by the air affects on the evaporation tray and thereby the water can evaporate more quickly.

[0014] A cooling device realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0015] Figure 1 - is the partial perspective view of a cooling device.

[0016] Figure 2 - is the top schematic view of the casing containing the components such as the compressor, condenser and the fan in a cooling device.

[0017] Figure 3 - is the perspective view of a cover and an evaporation tray integrated to the cover.

[0018] Figure 4 - is the perspective view of a cover, an evaporation tray integrated to the cover and the compressor disposed in front of the evaporation tray.

[0019] The elements illustrated in the figures are numbered as follows:

1. Cooling device
2. Compressor
3. Condenser
4. Casing
5. Fan
6. Cover
7. Evaporation tray
8. Discharge hose
9. Heat transfer surface
10. Water inlet orifice
11. Opening

[0020] The cooling device (1), for example the refrigerator or the freezer, comprises a body, a compressor (2) for maintaining the refrigeration cycle, a condenser (3) for condensing the refrigerant, a casing (4) wherein the compressor (2) and the condenser (3) are disposed, a fan (5) situated inside the casing (4) for cooling the condenser (3) and the compressor (2) by blowing air thereon, a cover (6) that covers the casing (4) and prevents access to the compressor (2) and the other components in the casing (4), an evaporation tray (7) situated inside the casing (4) for collecting the water during the defrost process to be evaporated thereafter and a discharge hose (8) that extends from the body into the casing (4) for transferring the defrost water into the evaporation tray

(7).

[0021] The cooling device (1) of the present invention comprises an evaporation tray (7) which is integrated on the surface of the cover (6) facing inside the casing (4) such that it is aligned with the compressor (2), and protrudes from the cover (6) towards the compressor (2) (Figures 2 and 4).

[0022] The evaporation tray (7) is integrated with the cover (6) such that the said evaporation tray (7) remains between the cover (6) and the compressor (2) and the heat disseminating from the compressor (2) body is effectively utilized since the evaporation tray (7) is at a position close to the compressor (2).

[0023] In the cooling device (1) of the present invention, the ice on the evaporator dissolves at the end of the defrost process and water received by the discharge hose (8) is collected in the evaporation tray (7) integrated to the cover (6). Water in the evaporation tray (7), which protrudes from the cover (6) to near the compressor (2), is evaporated by utilizing the heat of the compressor (2) when the cover (6) is closed. The evaporation tray (7) is shaped like a protrusion on the rear surface of the cover (6) and occupies a minimum amount of space inside the casing (4) thereby the interior volume of the casing (4) is used efficiently.

[0024] The evaporation tray (7) comprises a heat transfer surface (9) which faces the compressor (2) body and is parallel to the plane of the cover (6). The heat transfer surface (9) is disposed behind the compressor (2) such that a vertical wall is formed when the cover (6) is closed.

[0025] The evaporation tray (7), because of the limited volume in the casing (4), is configured as a flat box, having a depth (W) as much as the distance between the cover (6) and the compressor (2) at the maximum and comprises a heat transfer surface (9) having a wide area (Figure 2).

[0026] The evaporation tray (7) furthermore comprises a water inlet orifice (10) arranged on its upper surface whereto the discharge hose (8) is connected and an opening (11) for the exit of the evaporated water. The defrost water coming by means of the discharge hose (8) is collected in the evaporation tray (7) and the water evaporating due to the heat of the compressor (2) is expelled from the opening (11) (Figure 3).

[0027] In an embodiment of the present invention, the evaporation tray (7) is produced as a piece separate from the cover (6) and mounted on the cover (6) thereafter.

[0028] In another embodiment of the present invention, the evaporation tray (7) is produced as a single piece together with the cover (6).

[0029] The evaporation tray (7) is provided in the flow path of the air aspirated by the fan (5) into the casing (4) from holes (D) on the cover (6) and discharged out after passing over the condenser (3) and the compressor (2), the heat of the condenser (3) and the compressor (2) is carried by the air and affects on the evaporation tray (7) and thereby the water can evaporate more quickly (Figure 2).

[0030] In the cooling device (1) of the present invention, since the dimensions and shape of the evaporation tray (7) do not depend on the compressor (2), a single type evaporation tray (7) can be used even if the type of the compressor (2) changes, moreover when the evaporation tray (7) has to be taken outside, dismounting only the cover (6) is sufficient and the evaporation tray (7) can be taken out of the cooling device (1) body together with the dismounted cover (6).

[0031] The present invention is not limited to the embodiments disclosed above and a skilled person in the art can easily introduce different embodiments, within the scope of the protection disclosed by the claims of the present invention.

Claims

1. A cooling device (1) comprising a compressor (2) for maintaining a refrigeration cycle, a casing (4) wherein the compressor (2) is disposed, a cover (6) that covers the casing (4) and prevents access to the compressor (2) and other components in the casing (4), an evaporation tray (7) situated inside the casing (4) for collecting
water during a defrost process to be evaporated thereafter and a discharge hose (8) for transferring the defrost water into the evaporation tray (7) and **characterized by** the evaporation tray (7) which is integrated on the surface of the cover (6) facing towards the inside of the casing (4) such that said evaporation tray (7) is aligned towards the inside of with the compressor (2) and protrudes from the cover (6) towards the compressor (2), wherein the said evaporation tray (7) remains between the cover (6) and the compressor (2).

2. A cooling device (1) as in Claim 1, **characterized in that** the evaporation tray (7) comprises a heat transfer surface (9) facing towards the compressor (2) body and being parallel to the plane of the cover (6).

3. A cooling device (1) as in any one of the above Claims, **characterized in that** the evaporation tray (7) is configured as a flat box, having a maximum depth (W) as much as the distance between the cover (6) and the compressor (2).

4. A cooling device (1) as in any one of the above Claims, **characterized in that** the evaporation tray (7) comprises: a water inlet orifice (10) arranged on its upper surface whereto the discharge hose (8) is connected, and an opening (11) for the exit of the evaporated water.

5. A cooling device (1) as in any one of the above Claims, **characterized in that** the evaporation tray

(7) is produced as a piece separate from the cover (6) and mounted on the cover (6) thereafter.

6. A cooling device (1) as in any one of the Claims 1 to 4, **characterized in that** the evaporation tray (7) is produced as a single piece together with the cover (6).

7. A cooling device (1) as in any one of the above Claims, **characterized by** a condenser (3) for condensing the refrigerant, a fan (5) for cooling the condenser (3) and the compressor (2) by blowing air thereon and an evaporation tray (7) which is provided in the flow path of the air aspirated by the fan (5) into the casing (4) from holes (D) on the cover (6) and discharged out after passing over the condenser (3) and the compressor (2), disposed in the casing (4).

Patentansprüche

1. Kühlvorrichtung (1), umfassend einen Kompressor (2) zum Aufrechterhalten eines Kühlzyklus, ein Gehäuse (4), in dem der Kompressor (2) angeordnet ist, eine Abdeckung (6), die das Gehäuse (4) abdeckt und Zugriff auf den Kompressor (2) und andere Bauteile im Gehäuse (4) verhindert, ein Verdampfungsfach (7) zum Auffangen von Wasser während eines Abtauvorgangs und zum anschließenden Verdampfen, das in dem Gehäuse (4) angeordnet ist, und einen Ablassschlauch (8) zum Übertragen des Abtauwassers in das Verdampfungsfach (7), und **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) an der Oberfläche der Abdeckung (6) eingebaut ist, die dem Inneren des Gehäuses (4) zugewandt ist, derart, dass das Verdampfungsfach (7) am Kompressor (2) ausgerichtet ist und aus der Abdeckung (6) zum Kompressor (2) hin vorspringt, wobei das Verdampfungsfach (7) zwischen der Abdekkung (6) und dem Kompressor (2) bleibt.

2. Kühlvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) eine Wärmeübertragungsfläche (9) umfasst, die dem Körper des Kompressors (2) zugewandt ist und parallel zur Ebene der Abdeckung (6) ist.

3. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) als ein flacher Kasten konfiguriert ist, der eine maximale Tiefe (W) aufweist, die dem Abstand zwischen der Abdeckung (6) und dem Kompressor (2) entspricht.

4. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) eine Wassereinlassöffnung (10) an seiner Oberfläche aufweist, mit der der Ablassschlauch (8) verbunden ist, und eine Öffnung (11) für das Austreten des verdampften Wassers.

5. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) als ein von der Abdeckung (6) separates Teil hergestellt wird und anschließend an die Abdeckung (6) montiert wird.

6. Kühlvorrichtung (1) nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das Verdampfungsfach (7) als ein Teil zusammen mit der Abdekkung (6) hergestellt ist.

7. Kühlvorrichtung (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** einen Kondensator (3), der das Kühlmittel kondensiert, ein Gebläse (5) zum Kühlen des Kondensators (3) und des Kompressors (2), indem es Luft darauf bläst, und ein Verdampfungsfach (7), das im Strömungsweg der Luft vorgesehen ist, die vom Gebläse (5) über Löcher (D) an der Abdeckung (6) in das Gehäuse (4) angesaugt und abgelassen wird, nachdem sie über den Kondensator (3) und den Kompressor (2) geströmt ist, angeordnet im Gehäuse (4).

Revendications

1. Un dispositif de refroidissement (1) comprenant un compresseur (2) pour maintenir un cycle de réfrigération, un boîtier (4) où le compresseur (2) est disposé, un couvercle (6) qui couvre le boîtier (4) et qui empêche l'accès au compresseur (2) et aux autres pièces dans le boîtier (4), un bac d'évaporation (7) situé dans le boîtier (4) pour collecter l'eau pendant un processus de dégivrage à être évaporé par la suite et un tuyau d'évacuation (8) pour transférer l'eau de dégivrage dans le bac d'évaporation (7) et **caractérisé par** le bac d'évaporation (7) qui est intégré sur la surface du couvercle (6) en face de l'intérieur du boîtier (4) de telle sorte que ledit bac d'évaporation (7) est aligné avec le compresseur (2) et fait saillie du couvercle (6) vers le compresseur (2), où ledit bac d'évaporation (7) reste entre le couvercle (6) et le compresseur (2).

2. Un dispositif de refroidissement (1) selon la Revendication 1, **caractérisé en ce que** le bac d'évaporation (7) comprend une surface de transfert de chaleur (9) qui est en face du corps du compresseur (2) et qui est parallèle au plan du couvercle (6).

3. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le bac d'évaporation (7) est configuré comme une boîte plate, ayant une profondeur maximale (W) autant que la distance entre le couvercle

(6) et le compresseur (2).

4. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le bac d'évaporation (7) comprend une ouverture de prise d'eau (10) disposée sur sa surface supérieure, à laquelle le tuyau d'évacuation (8) est relié et une ouverture (11) pour la sortie de l'eau évaporée.

5. Un dispositif de refroidissement (1) selon l'une quelconque des revendications, **caractérisé en ce que** le bac d'évaporation (7) est produit comme une pièce séparée du couvercle (6) et montée sur le couvercle (6) par la suite.

6. Un dispositif de refroidissement (1) selon l'une quelconque des revendications de 1 à 4, **caractérisé en ce que** le bac d'évaporation (7) est produit en une seule pièce avec le couvercle (6).

7. Un dispositif de refroidissement (1) selon l'une quelconque des revendications précédentes, **caractérisé par** un condenseur (3) pour condenser le réfrigérant, un ventilateur (5) pour refroidir le condenseur (3) et le compresseur (2) en soufflant l'air sur ceux-ci et un bac d'évaporation (7) qui est disposé dans le trajet d'écoulement de l'air aspiré par le ventilateur (5) dans le boîtier (4) à travers les trous (D) sur le couvercle (6) et évacué après avoir passé sur le condenseur (3) et le compresseur (2), disposé sur le boîtier (4).

Figure 1

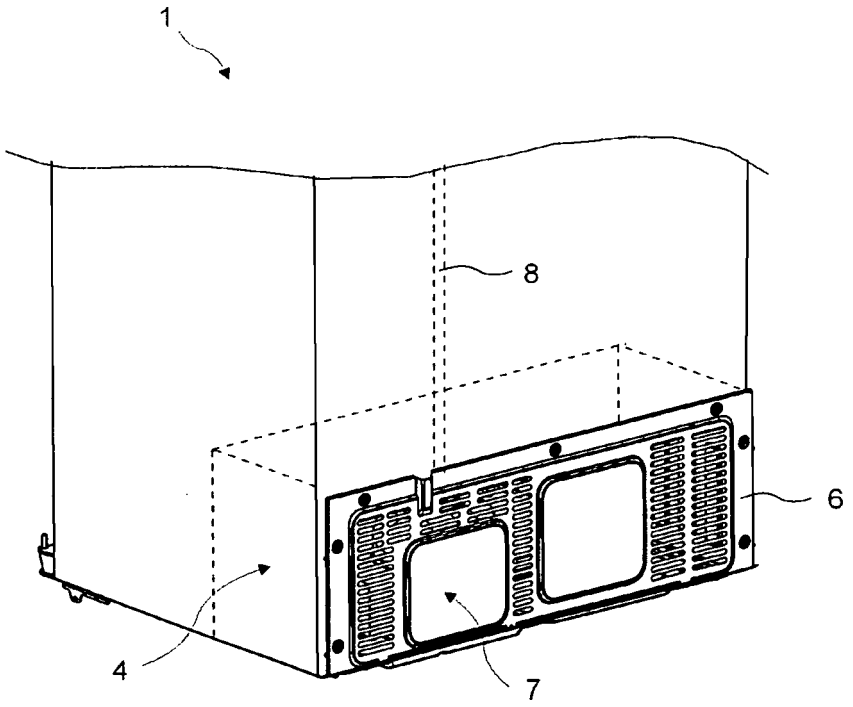


Figure 2

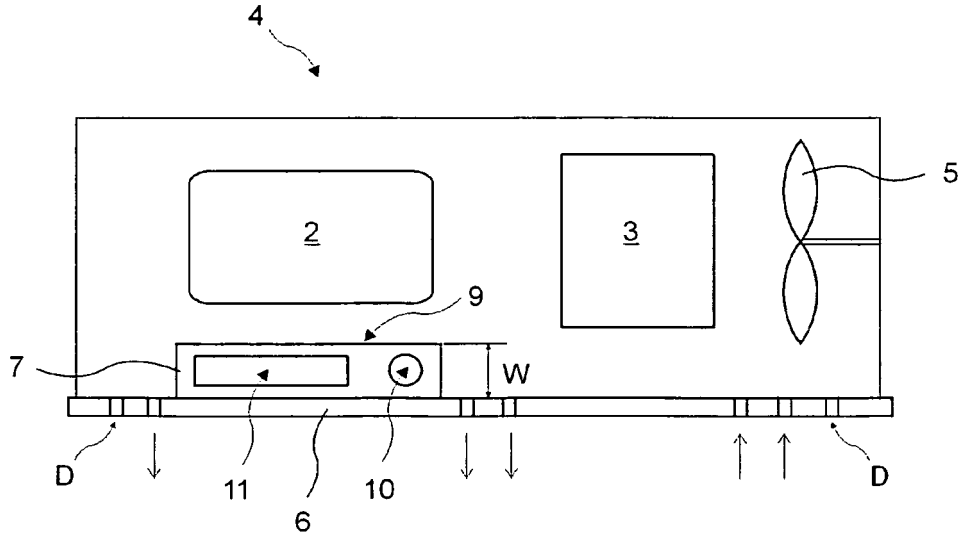


Figure 3

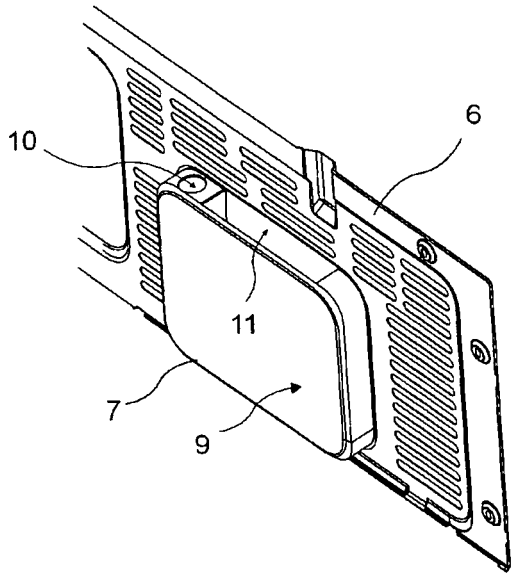
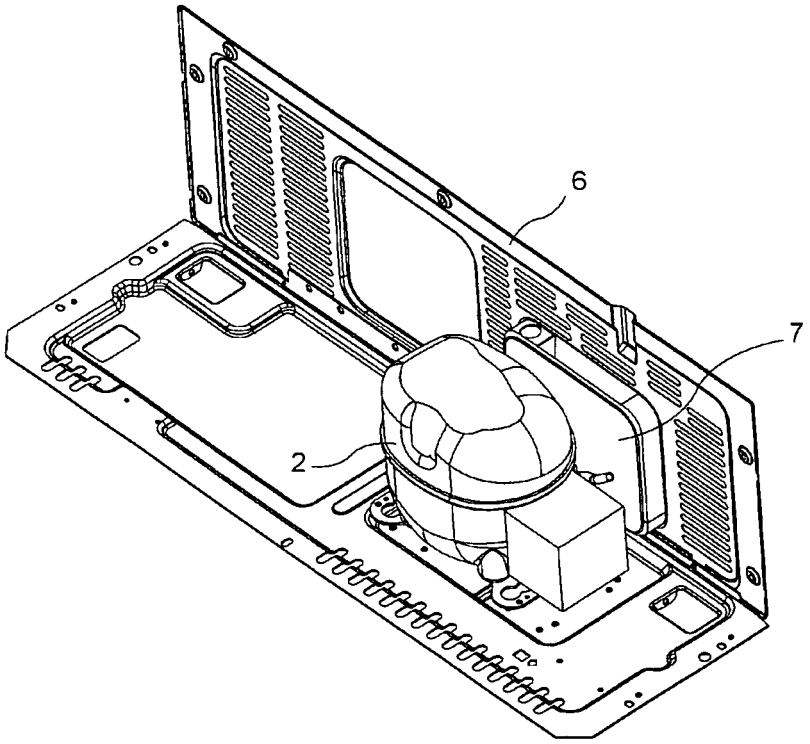


Figure 4



REFERENCES CITED IN THE DESCRIPTION

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